

## AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning at **page 12, line 11**, and insert the following rewritten paragraph:

Herein, the electrostatic capacity of the portion of the photoconductive layer over the hole is represented by  $C_H$ ; the electrostatic capacity of the portion of the photoconductive layer on the surface conductive layer,  $C_S$ ; the electric charge on the portion of the photoconductive layer over the hole,  $Q_H$ ; the electric charge on the portion of the photoconductive layer on the surface conductive layer,  $Q_S$ ; the electric potential of the portion of the photoconductive layer surface over the hole,  $V_H$ ; the electric potential on the portion of the photoconductive layer on the surface conductive layer,  $V_S$ ; the number of the resin particles for forming the second resin layer, deposited on the portion of the photoconductive layer over the hole,  $N_H$ ; the number of the resin particles for forming the second resin layer, deposited on the portion of the photoconductive layer on the surface conductive layer,  $N_S$ ; the distance between the portion of the photoconductive layer surface over the hole and the conductive layer surface  $d_H$ ; and the distance between the portion of the photoconductive layer surface on the surface conductive layer and the conductive layer surface,  $d_S$ .

Please replace the paragraph beginning at **page 23, line 9**, and insert the following rewritten paragraph:

Figs. 74(a) and (e)(b) show the schematical cross sectional views of an example of a circuit board in the present invention;

Please replace the paragraph beginning at **page 42, line 23**, and insert the following rewritten paragraph:

Next, the plated conductive layer 7 is provided on the exposed conductive layer 3-13 by means such as electrolytic plating (Fig. 59). Subsequently, the second resin layer is removed (Fig. 60), and furthermore, the first resin layer is removed (Fig. 61). Consequently, only the conductive layer in the hole can be thickened. The second resin layer and the first resin layer may be removed at a time.

Please replace the paragraph beginning at **page 48, line 16**, and insert the following rewritten paragraph:

Fig. 74 is a schematic sectional view showing a through hole in which the hole is filled with a conductive layer. Fig. 74(a) shows an example in which the land width is greater than 0 $\mu$ m and is equal to or smaller than 40 $\mu$ m. In Fig. 74(b), the land width is 0 $\mu$ m. In the circuit board according to the invention, if the height T1 of the conductive layer in the non-coupling portion of the land is equal to or greater than -5 $\mu$ m, and is equal to or smaller than the height T2 of the conductive layer in the coupling portion of the land and the land width L is equal to or smaller than 40 $\mu$ m, the inner part of the hole may be thus filled with the conductive layer.

Please replace the paragraph beginning at **page 76, line 29**, and insert the following rewritten paragraph:

By using a coating solution having a composition shown in Table 4, a film (a thickness of the film after drying is 10 $\mu$ m) formed by a photoconductive layer was manufactured on a polyethylene terephthalate film having a thickness of 25 $\mu$ m (manufactured by Mitsubishi Chemical Polyester Film Co., Ltd.) by using a curtain coating method. The photoconductive layer film was thermo-compression bonded to both sides of the substrate so that the photoconductive layer was provided on the conductive layer. Under an yellow safe light, a photomask having a circuit pattern drawn thereon (a conductor width and a gap : 50 $\mu$ m) was mounted and an ultraviolet exposure was carried out for 30 seconds by using a high pressure mercury lamp

light source apparatus for baking which has a sucking and adhering mechanism (UNILEC URM300 manufactured by USHIO INC.). Furthermore, the substrate was inverted to carry out the exposure to the ~~photo-crosslinkable resin~~~~photoconductive~~ layer on a reverse surface in the same manner.

Please replace the paragraph beginning at **page 81, line 10**, and insert the following rewritten paragraph:

For the substrate which had completely undergone the exposing processing, the second resin layer and the unhardened portion of the photo-crosslinkable resin layer were dissolved and removed by using xylene and a 1 mass% sodium carbonate aqueous solution (30 °C), thereby to form a resist circuit made up of the crosslinked portion. Then, the substrate was processed with a ferric chloride type etchant (40 °C, spray pressure 3.0 kgf/cm<sup>2</sup>kg/cm<sup>2</sup>), thereby to remove the exposed portion of the electrolytic copper plated layer, and the underlying electroless copper plated layer and the copper layer of the copper-clad laminate. The crosslinked portion of the photo-crosslinkable resin layer and the fourth resin layer used as an etching resist were removed with a 3 mass% sodium hydroxide aqueous solution (40 °C) and methyl ethyl ketone, resulting in a circuit board. The obtained circuit board was observed under a microscope. As a result, as shown in Fig. 89, it was found as follows: the through hole diameter L13 after finishing the hole-making processing = 150 µm, the through hole diameter L14 upon copper plating = 125 µm, and the land diameter L15 = 150 µm; and a landless through hole was formed. Whereas, no disconnection was observed in the circuit part and the through hole part.

Please replace the paragraph beginning at **page 82, line 20**, and insert the following rewritten paragraph:

At room temperature, each carrier film was peeled off. Then, the photo-crosslinkable resin layer surfaces on the opposite sides were charged by means of a

corona charging device (charging transformer output +5.0 kV~~+5.0 V~~). Subsequently, by using a positive-charge toner (manufactured by MITSUBISHI PAPER MILLS LIMITED., "ODP-TW") for Mitsubishi OPC printing system, a bias voltage of +200 V was applied to perform reversal development. As a result, the toner was electrolytically deposited on the entire surface except for the hole part. Subsequently, the toner was heated at 70 °C for 2 minutes, and fixed, resulting in a favorable second resin layer.

Please replace the paragraph beginning at **page 84, line 23**, and insert the following rewritten paragraph:

For the substrate which had completely undergone the exposing processing, the second resin layer and the unhardened portion of the photo-crosslinkable resin layer were dissolved and removed by using xylene and a 1 mass% sodium carbonate aqueous solution (30 °C), thereby to form a resist circuit made up of the crosslinked portion. Then, the substrate was processed with a ferric chloride type etchant (40 °C, spray pressure 3.0 kgf/cm<sup>2</sup>~~kg/cm<sup>2</sup>~~), thereby to remove the exposed portion of the electroless copper plated layer and the copper layer of the copper-clad laminate. The crosslinked portion of the photo-crosslinkable resin layer and the fourth resin layer used as an etching resist were removed with a 3 mass% sodium hydroxide aqueous solution (40 °C) and methyl ethyl ketone, resulting in a circuit board. The obtained circuit board was observed under a microscope. As a result, it was found that the land which is the portion of the conductive layer in the periphery of the through hole was formed concentrically with the through hole. As shown in Fig. 92, it was found as follows: the through hole diameter L21 after finishing the hole-making processing = 150 µm, the through hole diameter L22 upon copper plating = 125 µm, and the land diameter L23 = 180 µm; and a narrow land width through hole was formed. Whereas, no disconnection was observed in the circuit part and the through hole part.

Please replace the paragraph beginning at **page 87, line 23**, and insert the following rewritten paragraph:

The opposite sides of the substrate which had completely undergone the exposing processing were charged by means of a corona charging device (charging transformer output ~~+5.0 kV+5.0 V~~), so that an electrostatic latent image was formed thereon. The surface potential of the unexposed portion after 1 minute from the charging processing was 330 V, and the surface potential at the exposed portion was 100 V. Subsequently, by using a positive-charge toner ("ODP-TW" manufactured by MITSUBISHI PAPER MILLS LIMITED.,) for Mitsubishi OPC printing system, a bias voltage of 220 V was applied to perform reversal development. As a result, a toner image was obtained on the exposed portion of the conductive layer and on the circuit part of the photoconductive layer. Then, the toner was thermally fixed at 90 °C for 2 minutes, resulting in a third resin layer.

Please replace the paragraph beginning at **page 88, line 7**, and insert the following rewritten paragraph:

The portion of the photoconductive layer not covered with the third resin layer was dissolved and removed by using a 1 mass% sodium carbonate aqueous solution (30 °C), thereby to expose the portion of the electroless copper plated layer corresponding to a non circuit part. Then, the substrate was processed with a ferric chloride type etchant (40 °C, spray pressure ~~3.0 kgf/cm<sup>2</sup>kg/cm<sup>2</sup>~~), thereby to remove the exposed portion of the electroless copper plated layer and the underlying copper layer of the copper-clad laminate. The photoconductive layer and the third resin layer used as an etching resist were removed with a 3 mass% sodium hydroxide aqueous solution (40 °C), resulting in a circuit board. The obtained circuit board was observed under a microscope. As a result, as shown in Fig. 93, it was found as follows: the through hole diameter L24 after finishing the hole-making processing = 150 µm, the through hole diameter L25 upon copper plating = 125 µm, and the

through hole land diameter L26 = 150  $\mu\text{m}$ ; and a landless through hole was formed. Whereas, no disconnection was observed in the circuit part and the through hole part.

Please replace the paragraph beginning at **page 89, line 21**, and insert the following rewritten paragraph:

Thereafter, at room temperature, each polyethylene terephthalate film was peeled off. Then, the opposite sides of the photoconductive layers were charged by means of a corona charging device (charging transformer output ~~+5.0 kV+5.0 V~~). The surface potential was measured, and found to be +100 V for the portion of the photoconductive layer on the surface conductive layer, and +300 V for the portion of the photoconductive layer over the hole. Thus, it has been shown that a contrast in electric charge are caused between on the surface conductive layer and over the hole. Subsequently, by using a positive-charge toner (manufactured by MITSUBISHI PAPER MILLS LIMITED., "ODP-TW") for Mitsubishi OPC printing system, a bias voltage of +200 V was applied to perform reversal development. As a result, the toner was electrolytically deposited on the entire surface except for the hole part. Subsequently, the toner was heated at 70 °C for 2 minutes, and fixed, resulting in a favorable first resin layer.

Please replace the paragraph beginning at **page 91, line 6**, and insert the following rewritten paragraph:

Then, the opposite sides were charged by means of a corona charging device (charging transformer output +5.0 V). The surface potential was measured, and found to be +380 V. Subsequently, by using an acrylic resin emulsion (the toner described in Example 1 of JP-A-2002-296847), a bias voltage of +300 V was applied to perform reversal development, so that the toner was deposited on the portion of the conductive layer on the inner wall of the hole. The toner was thermally fixed at

90 °C for 2 minutes, resulting in a ~~third-fourth~~ resin layer. Then, by using propylene carbonate as a solvent which dissolves the first resin layer, but does not dissolve the ~~third-fourth~~ resin layer and the photoconductive layer, only the first resin layer was dissolved and removed from the surface. After washing with water, drying was carried out at 90 °C for 20 minutes.

Please replace the paragraph beginning at **page 92, line 17**, and insert the following rewritten paragraph:

The portion of the photoconductive layer not covered with the second resin layer was dissolved and removed by using a 1 mass% sodium carbonate aqueous solution (30 °C), thereby to expose the portion of the electroless copper plated layer corresponding to a non circuit part. Then, the substrate was processed with a ferric chloride type etchant (40 °C, spray pressure 3.0  $\text{kgf/cm}^2\text{kg/cm}^2$ ), thereby to remove the exposed portion of the electroless copper plated layer and the underlying copper layer of the copper-clad laminate. The photoconductive layer, the second resin layer, and the third resin layer used as an etching resist were removed with a 3 mass% sodium hydroxide aqueous solution (40 °C) and isopropyl alcohol, resulting in a circuit board. The obtained circuit board was observed under a microscope. As a result, as shown in Fig. 92, it was found as follows: the through hole diameter L21 after finishing the hole-making processing = 150  $\mu\text{m}$ , the through hole diameter L22 upon copper plating = 125  $\mu\text{m}$ , and the through hole land diameter L23 = 180  $\mu\text{m}$ ; and a narrow land width through hole was formed. Whereas, no disconnection was observed in the circuit part and the through hole part.

Before the paragraph beginning at **page 109, line 21**, (last paragraph on page 109) insert the following heading:

<Formation of Second Resin Layer>